Educational achievement in selective and comprehensive Local Education Authorities: a configurational analysis[1]

Abstract

Selective and comprehensive school systems vary in both the degree and timing of selection. To study the consequences of such variation, cross-national comparisons are usually undertaken. Given that cultural differences between countries affect pathways and outcomes, apportioning causal influence in such studies can be difficult. In 1970s Britain, selective and comprehensive systems co-existed. This enables us to compare the influences of organisational arrangements without the complication of national cultural differences. We analyse, for children of various abilities, while taking account of gender and class, the effect on achievement of experiencing comprehensive or selective schooling. Assuming that contextual and individual factors work conjuncturally in producing outcomes, we employ Ragin's configurational Qualitative Comparative Analysis. By treating cases in the National Child Development Study as configurations of factors, we are able to analyse the sufficient and necessary conditions for achievement. We find that system differences affect only some high ability children's educational outcomes.

Key words: Selective schooling, comprehensive schools, Qualitative Comparative Analysis (QCA), social class, National Child Development Study (NCDS), cognitive ability

Focus of the paper

Many countries today have a comprehensive secondary school system in place, with pupils of all abilities schooled together for most or all of their secondary school career, whereas the system in others is selective, with pupils being sorted into different school types after primary school according to academic ability. In a few times and places (for example England in the 1970s), the two systems have coexisted, with different administrative areas employing one or the other. Proponents of comprehensive systems, aiming for equality of outcome or opportunity in education, have argued that less academically able pupils benefit from being schooled together with more able peers[2]. Working class children in particular, who typically leave school earlier than their peers from higher social class backgrounds, are expected to

[1] This work was supported by an Economic and Social Research Council (ESRC) research fellowship [RES-063-27-0240] awarded to JG.

[2] Clearly, comprehensive schools can take different organisational forms, with greater or lesser internal differentiation by measured ability or early achievement. Some early advocates of comprehensives stressed the advantages of social mixing within comprehensives, while others wanted to see children of differing abilities in the same classrooms. Most of the comprehensive schools in Britain at this period were characterised by fairly high degrees of internal differentiation. For example, around 75% of English classes and over 85% of maths classes attended by 16 year olds in the NCDS were streamed by ability.

benefit from comprehensive education. Early selection still takes place in several European societies, for example in Germany, Switzerland and Austria. Proponents of these selective systems continue to argue that teaching in relatively homogeneous ability groups is better generally since the more academic pupils can be taught in a way that suits their talents while the less academic can receive teaching adapted to their needs. By applying configurational analytic techniques to an existing longitudinal dataset, this paper aims to contribute to the evaluation of the merits and demerits of the two systems by comparing pupil outcomes in the selective and comprehensive local education authorities (LEAs) which coexisted in England and Wales during the late 1960s and 1970s. By studying LEAs within one country and one period, we aim to avoid some of the problems that commonly arise when comparing these systems across countries and across time.

There was, of course, much debate around comprehensive versus selective schooling in the 1970s and 1980s, and while most parts of Britain changed from a selective to a comprehensive system, some retained the so-called 11 plus exam and selective secondary schooling. The topic therefore remains of interest to education theorists and practitioners. One reason for revisiting this debate now is that equality in education and fairness of access remain ongoing concerns in many countries. For example, widespread media coverage of the findings from the PISA[3] studies (e.g., Baumert et al., 2003, Gorard & Smith, 2004) have brought this topic yet again to the attention of the wider population. Another reason is that, as far as we are aware, configurational case-based methods, have not yet been applied to large survey datasets to explore this issue. The case-based method we use, Qualitative Comparative Analysis (QCA), is particularly useful here, given that it analyses configurations of factors associated with an outcome, and can readily take account of the ways in which factors such as social class interact with organisational context. It is likely that different types of students will be advantaged or disadvantaged under selective and comprehensive systems. QCA,

[3] Programme for International Student Assessment, a large scale international comparison of educational attainment.

which we explain in detail below, is particularly suitable for exploring this possibility. This study is part of a larger programme of work[4] concerned with the educational pathways of young people in two contrasting secondary school systems, contemporary England and Germany. Our main focus here will be on class differences in attainment in selective and comprehensive systems, though we use QCA specifically to address the ways in which these class differences vary as class position is conjoined in various ways with gender and ability.

Previous research

Selective and comprehensive school systems loosely correspond to Turner's (1960) ideal types of sponsored and contest mobility. Sponsored mobility (for which England at the time is his exemplar) involves early selection for an academic pathway and subsequent support for the chosen. Contest mobility (for which his exemplar is the US) is compared to a race in which everybody should have equal chances of succeeding, i.e. of obtaining the highest possible qualifications. Here, later selection keeps the possibility of obtaining any given outcome open much longer. These ideal types do not match real systems directly because there are elements of contest in selective systems where the opportunity for changing track later on exists (for Germany, see for example Glaesser, 2008, Glaesser & Cooper, 2010), and elements of sponsorship in contest systems, for example where a comprehensive school via internal differentiation may actually have a "grammar school stream".

There are several possible approaches to comparing selective and comprehensive schooling. One possibility is to undertake a within-country comparison over time in a country where the system has changed. A number of European countries, including Britain, have moved from selective to comprehensive systems at some point after the Second World War. However, at

[4] It is the programme of work undertaken as part of an ESRC research fellowship held by JG, with BC as her mentor. The fellowship is entitled "Exploring and evaluating the use of configurational methods in large n contexts: transitions in the English and German educational systems".

the same time other changes were taking place in parallel, such as growing participation in education at all levels, more girls being educated to higher levels and changes in the occupational structure of the labour market, which makes it difficult to attribute any differences in attainment levels solely to the transition to a comprehensive school system. Another strategy is to compare countries – at one point in time – where different systems are in place. The difficulty here is that, again, other differences between the countries under study may be at least partially responsible for any differences found.

Based on an analysis of the PISA data, Gorard and Smith (2004) conclude that in countries with academic selection there is a greater gap in educational outcomes between the best and worst performing pupils. In such countries, the differences between pupils from different social class origins also tend to be greater. Dupriez and Dumay (2006) find that countries with comprehensive systems are more egalitarian in that sense, although they argue that this could be due to the fact that these countries are more egalitarian overall, particularly with regard to income distribution. Ambler and Neathery (1999), focusing on class, undertake a comparison over time as well as across countries, analysing the situations in France, Sweden, Britain and Germany, and also referring to the USA in their conclusion. They focus on the period from the 1960s to the 1990s during which major educational expansion, both of participation and of qualifications earned, took place in Western countries. As well as desiring a well-educated workforce to maintain and/or increase competitiveness in a global market, many policy makers hoped that expansion would reduce the well-known inequalities in access to education and transmission of social class advantages across generations (e.g., Müller, 1998). Others claimed simply that education was a civil right for all (Dahrendorf, 1966). However, contrary to expectations, educational expansion does not seem to have led to greater equality of outcome in education. That is, while working class children did have a greater chance of obtaining post-compulsory education than their parents' generation, thus experiencing absolute educational mobility, the relative chances of working class children did

not increase at the same rate because middle-class children, too, benefited from educational expansion (e.g., Becker, 2003, Breen & Goldthorpe, 1997, Goldthorpe, 2003, Müller, 1998, Shavit & Blossfeld, 1993, Vester, 2006).

Focusing on the effects of secondary school reforms, Ambler and Neathery (1999) find that, in the context of post-war educational expansion, comprehensivisation in France, Sweden and Britain has not led to markedly reduced inequality in education, by which they mean the impact of social class origin on educational achievement. Sweden is slightly different to the other two countries in that there has been a greater reduction in educational inequality there, but this has slowed and this reduction had started well before the effects of comprehensivisation could have been felt. Germany has not undergone comprehensivisation. Here, again, despite a huge increase in participation in education, the effect of this expansion on equalisation of participation in higher levels of education has not been as large as hoped. Expansion in the US took place earlier than in Europe, but here, too, class as well as ethnic differences in educational outcomes persist. Erikson and Jonsson (1996), whose work Ambler and Neathery (1999) quote, also point out that, while there has been a move towards greater equality of outcome, the same *patterns* of class inequality characterise both Sweden and other countries. There are a number of possible explanations why inequality is relatively lower in Sweden, among them a school system which facilitates transitions at any point, so that there are few "dead ends" (p.36). Another reason is likely to be that there is a broad general consensus in Swedish society that a move towards a more egalitarian society is desirable, and so there has been much support for school reforms in the general population (see also Dupriez & Dumay, 2006).

These findings show that it is not straightforward to determine whether comprehensive schooling reduces class differences of outcome between social groups. Differences in the latter between countries might be due to social, economic and/or cultural differences and

differences over time might be due to other secular changes such as educational expansion, changes in the demand for various types of skill in the labour market, and so on.

In Britain, the implementation of the 1944 Education Act led to the tripartite system of secondary schooling, with the three school types being selective grammar schools, technical grammar schools (whose numbers actually remained very small), and secondary modern schools for those children who had failed the grammar school entrance exam, the eleven plus. One of the aims of this Act was to ensure greater ease of access to post-compulsory education for able working class children (that is, there was a concern with raising their chances of gaining educational credentials; see for example Halsey et al., 1980) and an associated reduction in class differences in educational outcomes. However, even though the tripartite system certainly did enable some working class children to gain access to post-compulsory education and, subsequently, to higher education through the grammar school route, overall they were less likely to gain access to grammar schools than middle class children, and, if they did get selected, they were at a greater risk of dropping out (Ministry of Education, 1954), though some relevant evidence concerns just boys (e.g., Halsey et al., 1980, Lacey, 1970). The absolute mobility of working class children did not increase as much as had been hoped, while relative chances did not improve because middle class children simultaneously increased their participation in post-compulsory education. From the 1960s, partly to address these problems, comprehensive schools were gradually introduced, again in the hope of reducing inequality in educational outcomes between children from different class backgrounds. However, it is not clear that comprehensivisation has contributed to levelling rates of participation in post-compulsory schooling or rates of attainment of O level or better qualifications between social classes (for an overview, see for example Heath & Jacobs, 1999). Nor, on the other hand, has overall attainment fallen (Gray et al., 1984, and others in this special issue on comprehensivisation in the Oxford Review of Education), contrary to critics' fears. Crook et al. (1999) provide an extensive overview of research on the

effectiveness of selective and comprehensive schooling in Britain. They conclude that overall there appears to be little difference between the two systems in terms of qualifications gained and that "promoting higher achievement across the board will require more than a change of school admissions policies alone" (p. 49).

One of the problems in evaluating the success or otherwise of the comprehensive school reforms in Britain is that here, as elsewhere, other developments coincided with the reforms, so that it is difficult to decide whether, for example, a general increase in levels of qualifications would have taken place anyway. Nevertheless, Britain is an interesting case because comprehensivisation took place over an extended period of time, with various kinds of schools and Local Education Authority systems existing alongside each other. This makes it possible to undertake comparisons at the same point in time for the two systems. Galindo-Rueda and Vignoles (2005) use data from the National Child Development Study (NCDS), the data we use in this paper, to show that there is no clear overall effect of one or the other system, but that there are interaction effects with ability, so that, for example, the most able children benefit more from a selective system. However, they do not use data on which type of LEA a child lived in, but instead infer the type of LEA from the type of school attended. This is problematic because a comprehensive school in a largely selective system might have a different pupil composition and approach to teaching than a comprehensive school in a purely comprehensive LEA, as Manning and Pischke (2006) point out. Having argued that, in evaluating *systems*, it is not appropriate simply to compare pupils who attend selective or non-selective *schools,* Manning and Pischke proceed to use the British case to undertake a within-country comparison of systems. They include in their analysis only those pupils who were either in Local Education Authorities (LEAs) still using selection based on academic performance at the age of 11, or in LEAs which had already undergone comprehensivisation, in order to be able to draw conclusions about systemic effects rather than school effects. Their interest is not so much substantive as methodological in that they aim to show that

previous studies on the topic suffer from selection effects resulting from differences in social composition of the population between selective and comprehensive LEAs. They conclude that, due to these selection effects, little has been learned so far about the effects of comprehensivisation.

Our approach

The evidence from the research briefly outlined in the previous section is inconclusive with regard to an overall effect of comprehensive and selective schooling. As noted, working class children are of particular interest since they are thought to lose out in a selective system. Not only may they be disadvantaged by the selection process, but also their dropout rate, once they were selected, was higher (Lacey, 1970, Ministry of Education, 1954). However, some advocates of selection did see the grammar schools as providing opportunities for academically able children from all social classes. To explore the issue of how specific types of children fare in the two systems, we, like Manning and Pischke (2006), use data from the NCDS, concentrating on those cases who were either in LEAs still using selection based on academic performance at the age of 11, or in LEAs which had already undergone comprehensivisation. We exclude cases from LEAs in which there was a mix of systems. As mentioned, the advantage of this within-country, between-LEA, approach is that it avoids some problems arising from cross-national research or research involving a comparison over time. While Manning and Pischke employ regression based methods, we aimed to address some of the shortcomings of regression (see below) by using a different analytic approach. In using configurational Qualitative Comparative Analysis (QCA), we represent types of cases by configurations of features. Our main focus is on social class, but given our awareness that class does not act in isolation, but configurationally with gender and ability in producing differentiated educational outcomes, we include these factors in our analyses.

Data

The National Child Development Study (NCDS) is a longitudinal study based on all those children born during one week in March 1958 (Centre for Longitudinal Studies, 2008). The cohort members therefore entered their secondary schooling in 1969, while the process of comprehensive reorganisation was in full swing. We only use cases from LEAs which were either fully comprehensive or fully selective in 1969, and only those cases with no missing values on any of the variables we're using (n = 2366).

Method: Qualitative Comparative Analysis (QCA)

In recent years, there has been considerable critical discussion of the assumptions implicit in the family of variable-based methods that employ linear regression in simple or complex forms (e.g., Abbott, 2001, Freedman, 1987, Lieberson, 1985, Ragin, 2000). There is a concern that these methods do not do full justice to the causal complexity of the social world (Abbott, 2001, Lieberson, 1985), analysing as they do the net effects of supposedly independent variables within, typically, an assumption of causal homogeneity. QCA, by contrast, is a holistic approach which preserves the particular combinations of features of a case, drops the assumption of the independence of causes, and is orientated to analysing causal heterogeneity in the social world, using the concepts of necessary and sufficient conditions. Originally developed for use with small to medium-sized data sets (Ragin, 1987, 2000, 2008), QCA has also been used with large n data (Cooper, 2005, Cooper & Glaesser, 2008, 2010a, b, Glaesser & Cooper, 2010, Ragin, 2006) and provides an alternative to the regression methods commonly used to analyse such datasets.

We now introduce QCA, though within the space of a paper, we cannot do more than give an impression of what it is able to do, and refer the reader to Ragin's publications for more details.

Consider the following equation, taken from a paper by Mahoney and Goertz (2006):

$$Y = A*B*c + A*C*D*E$$

In Boolean notation, capital letters stand for the presence of a condition, lower case letters for the absence of a condition, or logical NOT. The * symbol represents logical AND, the + logical OR. This equation therefore shows two alternative pathways to the outcome Y: one is the combination of the presence of both A and B with the absence of C, the other is the presence of all of A, C, D and E. Either pathway is sufficient to obtain the outcome, but neither is necessary, given the existence of the other. To capture such causal complexity, Mackie (1974) developed the concept of an INUS condition, taken up by Ragin (1987). An INUS condition is an insufficient but necessary part of a condition which is itself unnecessary but sufficient. In this equation, B is an example of an INUS condition because it is itself insufficient (A and the absence of C are also required), but it is a necessary part of the conjunction of conditions A*B*c which is sufficient, but not necessary given the existence of A*C*D*E.

Sufficiency and necessity involve subsethood relations. Consider Table 1 (based on Boudon, 1974, as discussed in Cooper, 2005):

- insert Table 1 here –

This relationship is reflected in the Venn diagram in the left hand panel of Figure 1.

- insert Figure 1 here -

Condition A is logically sufficient for outcome O, that is, whenever A occurs, O will occur, as is shown in the left hand panel of Figure 1. In set theoretic terms, A constitutes a subset of

O. In the real world, relations are usually less than perfect and we are likely to find a situation such as the one represented in the right hand panel of Figure 1, where most but not all cases with the condition A obtain the outcome O. This situation is often termed quasi-sufficiency. The proportion of cases with the condition who obtain the outcome gives the degree of consistency with sufficiency[5]. For an illustrative example, drawing on the NCDS data, consider Table 2, where the numbers indicate the number of cases with the given combination of condition and outcome.

- insert Table 2 here

88.7% of those with the condition A (here, being of service class origin) have outcome O (here, obtaining at least O level qualifications or equivalent), so this condition might be said to be quasi-sufficient for obtaining the outcome. However, Table 2 also illustrates that this is not a necessary condition, as a considerable number of cases without condition A still have O.

Venn diagrams can also be used to introduce the concept of explanatory coverage. Analogous to variance explained in regression analysis, coverage indicates how important a condition is with respect to explaining the outcome. In the diagrams above (Figure 1), we can see that there must be other conditions which also lead to the outcome, since a substantial area of the outcome set, O, is not covered by the condition set, A. Numerically, coverage is expressed as the proportion of cases with the outcome who also have the condition[6].

Necessity also involves subsethood. Here, the outcome must be a subset of the condition (see Figure 2), i.e., without the condition, the outcome is not obtained, but not all cases with the condition need obtain the outcome. Consistency with necessity can be calculated in an

[5] This is true in the crisp context, where a case is either completely in or completely out of a set. Within fuzzy set QCA, cases can have partial membership in a set and therefore assessing quasi-sufficiency becomes a more complex and contentious matter. Since this paper uses crisp sets only, we don't discuss fuzzy sets here but refer the reader to Ragin (2000, 2005, 2008) as well as Cooper (2005) and Cooper and Glaesser (2010).

[6] In fuzzy set QCA, things are more complicated.

analogous manner to sufficiency by using the proportion of the cases with the outcome who have the condition. In this paper, we concentrate on sufficient conditions.

- insert Figure 2 here -

So far, to keep matters clear, we have only considered one condition in relation to some outcome. However, QCA addresses conjunctions of conditions. Adding a second condition, B (here, achieving a score in the top 10 percent of the ability test), to our example, produces Table 3.

- insert Table 3 here -

In order to perform a QCA analysis, one's data are arranged differently, in a truth table (Table 4). This is the first stage of an analysis which can be carried out readily using the fs/QCA software (Ragin et al., 2006).

- insert Table 4 here -

"1" is entered in the conditions columns if the condition is present, "0" when it is absent. The last column gives the consistency with sufficiency, which in a crisp set analysis is simply the proportion of cases with the conjunctions of conditions who have the outcome. The rows are in descending order of consistency. Rows represent cases with configurations of the conditions, so the first row in our example represents all those cases who are characterised by the combination of having conditions A *and* B, the next row all cases with condition B *and not* condition A and so on.

The truth table is then used to generate a Boolean solution. To do this, we have to decide on a threshold above which we consider consistency high enough to indicate quasi-sufficiency. It is common to choose a threshold of around 0.8, and usually no lower than 0.7, while taking into account any jumps in consistency from one row to the next of the table[7]. A useful approach is also to work through various levels of consistency (Cooper, 2005), since this gives a more detailed picture of the relationships between conditions and outcome and makes the process more transparent by demonstrating to the reader how the results vary depending on the chosen threshold. In our example, our having initially chosen a threshold of 0.8 is reflected in the 1s and 0s we have entered into the outcome column in Table 4. This results in the first three rows entering the minimisation process. The relevant configurations are A*B, a*B and A*b which can be simplified to A+B (for more details on the Boolean process of logical minimisation see Cooper, 2005, Quine, 1952, Ragin, 1987, 2000). Table 5 shows the output.

- insert Table 5 here -

The capital letters indicate that the presence, not the absence, of conditions A and B is required, and the plus symbol ("OR") indicates that just one on its own is (quasi-)sufficient. They may overlap, that is, the combination A*B is also included in the solution. The output gives consistency (0.904) and coverage (0.422) of the solution A+B as a whole. In addition, the consistency of each element is given, 0.887 for condition A and 0.986 for condition B. Given that there are two alternative pathways to the outcome, A and B, coverage for each can be partitioned into two elements, unique and raw coverage. The unique coverage figures give the coverage for each path in the solution which is due just to its non-overlapping part,

[7] Readers concerned that such threshold-setting seems arbitrary should bear in mind that much decision-making in the social sciences involves the researcher's judgement. An example is the choice of a 5% level in significance testing.

whereas the raw coverage figures give the coverage of all of this path, including any overlaps with other paths. For example, for condition A in the Venn diagram (Figure 3)[8], the second darkest area corresponds to the unique coverage of this configuration, and the second darkest and the darkest together correspond to the raw coverage.

- insert Figure 3 here -

QCA may be used with more than two conditions. Note that the number of rows in the truth table grows exponentially with more conditions added, so using three conditions results in a truth table of $2^3 = 8$ rows, four conditions generate $2^4 = 16$ rows and so on. We now turn to the NCDS.

Results

Analysis of at least A level outcome

To begin with, we analyse conditions associated with the outcome of having obtained at least A level (or its equivalent) as the highest qualification by the age of 33, i.e. the qualification required to go to university. The conditions are gender, social class (in three categories: service, intermediate and working class, based on Goldthorpe's class scheme[9], ability at age 11 (with "high ability" defined as having been in the top 20% of the distribution, based on a test of general ability), and whether someone was in an LEA which still had a selective system in place or whether the LEA had adopted a comprehensive system. Table 6 is the truth table for this analysis. Note that there is no separate column for the intermediate class category. Clearly, anybody who is neither service class nor working class, i.e. whose entry in those two columns is "0", is intermediate class.

[8] Note that this diagram is not to scale. It is also idealised because not all cases with the conditions do actually achieve the outcome, but for simplicity's sake, this is not represented in the diagram.
[9] The data in the NCDS is in the form of each father's socioeconomic group. We have used the approach of Heath and McDonald (1987) to recode these data to produce an approximation to the Goldthorpe scheme.

- insert Table 6 here -

Prior to seeking a Boolean solution, inspecting the truth table itself can be instructive. The rows here are ordered in descending order of consistency with sufficiency so that rows with the highest proportion of cases obtaining the outcome can be found mainly at the top of the table. We can see, for example, that configurations including the condition "high ability" can be found nearer the top of the table, and that cases are distributed unevenly across the rows, since some configurations of conditions are more common than others.

The next step is to obtain a Boolean solution from this truth table (Table 6) which gives conditions or conjunctions of conditions quasi-sufficient for obtaining an outcome. As described above, this is achieved by choosing a minimal threshold for the proportion obtaining the outcome. Configurations with proportions above this threshold are considered to be quasi-sufficient for the outcome. Here, our chosen threshold is 0.79. This is reflected by the 1s and 0s entered into the outcome column, "at least A level". Given that rows 5 and 6 have consistencies only just below 0.8 and are not far apart from the next highest consistency (rows 3 and 4 at 0.825 each), it would not be justified to set the threshold at 0.8 exactly. Six configurations therefore enter the solution. The subsequent process of logical minimisation condenses these into an overall solution comprising two alternative quasi-sufficient pathways (see Table 7). One is the combination of a service class origin with high ability (with gender and type of LEA being irrelevant for this group of cases at the chosen threshold for quasi-sufficiency). The other is, for those who aren't from a service class background, the combination of being male with having high ability and with attending a school in an LEA using selection.

- insert Table 7 here -

Raw and unique coverage for each element of the solution are identical here because there is no overlap: CLASS_S is part of the first element and class_s, i.e. the absence of a service class background, is part of the second element, and there cannot be cases who both are and aren't members of the service class. Using the coverage figures as an indicator, the first of the solution element – which doesn't contain gender or LEA type – appears to be the more important pathway to obtaining the outcome. Still, it is interesting to note that there is a subgroup (high ability males from non-service class backgrounds) for whom growing up in a selective LEA is a quasi-sufficient condition for obtaining at least A level.

Another way of using the truth table is to pick out particular rows of interest and to undertake pairwise comparisons. This does not constitute a regression-like comparison of an average difference while controlling for other supposedly independent variables across cases. Instead, cases remain as holistic configurations of features. In addition, despite our interest in how the systems compare, we should be cautious in undertaking direct comparisons of the levels of qualifications obtained in each. A relevant comparison would be of working class males of high ability in the two systems, with 79% obtaining the outcome in a selective system vs. 66% in a comprehensive one (truth table rows 5 and 8). However, given that the average level of qualification is higher in selective LEAs, any differences found could be attributable to this difference – which may have existed prior to any organisational reform – instead of to the systems per se. For that reason, we compare types of children *within* systems and then compare the magnitude of those differences *between* systems instead. For example, in selective LEAs, the difference between service class and working class males with high ability (truth table rows 1 and 5) in the proportion obtaining the outcome is 11 percentage points, and the ratio of the service to the working class proportions is 1.15, whereas the

difference is around 20 percentage points (truth table rows 2 and 8) in comprehensive LEAs, with a service to working class ratio of 1.3 (Tables 8 and 9). The differences between service class and working class girls are different in magnitude, but they follow the same pattern, i.e. the difference is greater in selective than in comprehensive LEAs.

- insert Table 8 and Table 9 here -

On the whole, however, differences between different groups in the two systems are fairly similar. The main difference is that between able working class and able service class children: the able working class children seem to fare relatively better in a selective system. We now turn to an analysis of a lower level of qualification.

Analysis of at least O level outcome

The analyses presented above focused on children of high ability and whether they achieve a fairly high level of qualification. We now turn to an analysis of who achieves at least O level or its equivalent. The conditions are the same as above, except that we are using "being in the bottom 30% of the ability distribution" as a condition instead of high ability. By focusing on a lower level of qualification as the outcome and on the least able rather than the most able on the condition side, we are able to expand our configurational account of how children of different classes and abilities fared in the two systems. For reasons of symmetry, it might have been appropriate to use the bottom 20% (instead of 30%) of the ability distribution. But if we did that, the case numbers in some configurations would be very low (for example, there are just six service class girls in comprehensive LEAs who are in the bottom 20% of the ability distribution)[10].

[10] It is also the case that there was a specific reason for choosing 20% earlier, in that around this proportion of children entered selective schools in selective LEAs. No such reason applies here.

- insert Table 10 here -

Again it is instructive to start by inspecting the truth table (Table 10). There are two marked gaps in consistency in the top part of the table: one between rows 10 and 11, and one between rows 12 and 13. This second one occurs immediately after the top half of the table which contains all configurations who are not in the low ability group, i.e. a higher proportion of individuals from those groups obtain this level of qualification.

To obtain a Boolean solution, we enter all the rows above the first drop in consistency into the minimisation process, thereby using a cut-off threshold for consistency of 0.8. The result is shown in Table 11.

- insert Table 11 here -

Here, too, we obtain two quasi-sufficient pathways. One, for both men and women, is not being of low ability combined with a non-working class background. Note that not being of low ability is not the same as being of high ability, our focus in the previous analysis. The other pathway, for males only from intermediate or working class backgrounds, is not being of low ability. With regard to the focus of this paper, it is interesting to note that type of LEA is not an element of either of the pathways. Pairwise comparisons among configurations containing low ability cases do not point to the presence of a substantial difference between LEA types, either. For example, in selective LEAs, the difference between service class boys and working class boys of low ability is one percentage point (truth table rows 14 and 15) and four points in comprehensive LEAs (rows 17 and 19).

We do not have space here to report in detail an analysis of the O level outcome using high ability as a condition. Briefly, the results were that for this lower level of qualification, class,

ability and gender in various combinations were part of quasi-sufficient conditions, but type of LEA did not form a part of the solutions.

Conclusion

The evidence from both our own analyses here and those of other authors is mixed. As outlined at the beginning, there is some evidence from various studies that a comprehensive system is associated with more equality of outcome in education. Specifically, the attainment gap between pupils from a high and low social class background tends to be smaller in comprehensive systems (e.g., Ambler & Neathery, 1999, Dupriez & Dumay, 2006, Gorard & Smith, 2004), although, as we noted, such findings need to be interpreted with caution given the problems of comparisons over time and cross-country comparisons. We have tried to avoid these problems by concentrating on just England and Wales at one point in time. In line with other authors' findings, our Boolean analyses confirm the importance of ability, class background and gender for educational attainment within both systems, but our particular focus is on the configurations of factors associated with various outcomes. We find that, for having at least A level qualifications, growing up in a selective LEA forms one element of a quasi-sufficient pathway to this outcome (the pathway MALE*class_s*HIGH_ABILITY*LEATYPE_SELECTIVE, Table 7). Apart from that, type of system did not appear either as part of the other pathway leading to A level or in any part of the configurations associated with obtaining the lower level of qualification, O level. Nor did growing up in a comprehensive system feature in any of the parts of the solutions. The within-system pairwise comparisons we undertook confirm the impression of relative unimportance of school system: the attainment gaps between various groups do not differ hugely between the systems. The one exception concerned children of high ability: the difference between working class children and service class children of high ability was

markedly smaller in the selective system than in the comprehensive system with regard to obtaining at least A levels.

Our analyses show that conjunctions of class, ability and gender are more important than system in predicting attainment (see also our earlier reference to the conclusion by Crook et al., 1999, that there appears to be little difference between comprehensive and selective systems with regard to qualifications obtained). These cross-case analyses, however, given their nature, cannot tell us why system differences matter relatively little.

QCA has proven useful here because it is well-suited to taking account simultaneously of the organisational context in which educational pathways are located and the configurations of factors associated with various outcomes. It has allowed us to explore whether outcomes achieved by configurationally-defined types of pupils vary or not by system. One of our findings was that the most able non-service class children achieve outcomes more similar to service class children in a selective system compared to those in a comprehensive one. This might seem surprising, given the claim (see introduction) that selective systems lead to a stronger, rather than weaker, link between social origin and educational outcomes. An explanation could be that in a selective system, highly able non-service class children, if selected for grammar schools, experience Turner's "sponsorship". However, caution is required here because, in this paper, we have not analysed the allocation of children to types of school within the selective system, and so we cannot take account of the fact that children of similar abilities from different class origins may not have similar chances of being selected for the grammar school. In other words, the working class children who attend grammar school may be more highly selected, i.e. more able, than their service class peers. In addition, it should be borne in mind that this was a transitional period, so those LEAs which had recently made the transition to comprehensive schooling may still have suffered the after-effects of major upheaval and this may have affected negatively the careers of high ability children. In addition, we should also stress that, since we have compared selective and

comprehensive LEAs in England and Wales at one particular period, our findings clearly should not be used to make claims about selective and comprehensive systems in general. For example, at this time, as we have noted, there was considerable internal differentiation by measured ability or early achievement within the comprehensive school and, in this regard, these comprehensives represent only one possible realisation of the comprehensive ideal. Of course, this is true to some extent of the comprehensive schools existing today. Since the 1960s, comprehensive LEAs have become the norm, though, as noted above, a minority of LEAs retain selective systems. At intervals there are demands, mainly from the political Right, for a more widespread return to a selective system. Our findings suggest that, in order to reduce class differences in opportunity or attainment, the focus of attention, as many have argued, will need instead to be on reducing socioeconomic and cultural differences per se and/or improving the effectiveness of schooling for less advantaged children.

References

Abbott, A. 2001. *Time Matters. On theory and method*. Chicago and London: University of Chicago Press.

Ambler, J.S., and J. Neathery. 1999. Education policy and equality: some evidence from Europe. *Social Science Quarterly* 80, 3: 437-56.

Baumert, J., R. Watermann, and G. Schümer. 2003. Disparitäten der Bildungsbeteiligung und des Kompetenzerwerbs. Ein institutionelles und individuelles Mediationsmodell. *Zeitschrift für Erziehungswissenschaft* 6, 1: 46-72.

Becker, R. 2003. Educational expansion and persistent inequalities of education. Utilizing subjective expected utility theory to explain increasing participation rates in upper secondary school in the Federal Republic of Germany. *European Sociological Review* 19, 1: 1-24.

Boudon, R. 1974. *The Logic of Sociological Explanation*. Harmondsworth: Penguin.

Breen, R., and J.H. Goldthorpe. 1997. Explaining Educational Differentials. Towards a Formal Rational Action Theory. *Rationality and Society* 9, 3: 275-305.

Centre for Longitudinal Studies. 2008. *National Child Development Study: Childhood Data, Sweeps 0-3, 1958-1974; Local Authority Data, 1958-1974: Special Licence Access; Sweep 5, 1991*. Second Edition. Colchester, Essex: UK Data Archive [distributor], August 2008.

Cooper, B. 2005. Applying Ragin's Crisp and Fuzzy Set QCA to Large Datasets: Social Class and Educational Achievement in the National Child Development Study. *Sociological Research Online* 10, 2: http://www.socresonline.org.uk/10/2/cooper.html.

Cooper, B., and J. Glaesser. 2008. How has Educational Expansion Changed the Necessary and Sufficient Conditions for Achieving Professional, Managerial and Technical Class Positions in Britain? A Configurational Analysis. *Sociological Research Online* 13, 3: <http://www.socresonline.org.uk/13/3/2.html>.

Cooper, B., and J. Glaesser. 2010a. Contrasting variable-analytic and case-based approaches to the analysis of survey datasets: exploring how achievement varies by ability across configurations of social class and sex. *Methodological Innovations Online* 5, 1: 4-23.

Cooper, B., and J. Glaesser. 2010b. Using case-based approaches to analyse large datasets: a comparison of Ragin's fsQCA and fuzzy cluster analysis. *International Journal of Social Research Methodology*: doi: 10.1080/13645579.2010.483079.

Crook, D., S. Power, and G. Whitty. 1999. *The grammar school question. A review of research on comprehensive and selective education*. London: Institute of Education.

Dahrendorf, R. 1966. *Bildung ist Bürgerrecht*. Hamburg: Nannen-Verlag.

Dupriez, V., and X. Dumay. 2006. Inequalities in school systems: effect of school structure or of society structure? *Comparative Education* 42, 2: 243-60.

Erikson, R., and J.O. Jonsson. 1996. Explaining class inequality in education: the Swedish test case. In *Can education be equalized? The Swedish case in comparative perspective*, 1-63. Boulder: Westview Press.

Freedman, D.A. 1987. As others see us: a case study in path analysis. *Journal of Educational Statistics* 12, 2: 101.

Galindo-Rueda, F., and A. Vignoles. 2005. The heterogeneous effect of selection in secondary schools: understanding the changing role of ability. London: Centre for the Economics of Education, LSE.

Glaesser, J. 2008. Just how flexible is the German selective secondary school system? A configurational analysis. *International Journal of Research and Method in Education* 31, 2: 193-209.

Glaesser, J., and B. Cooper. 2010. Selectivity and flexibility in the German secondary school system: a configurational analysis of recent data from the German Socio-Economic Panel. *European Sociological Review*: doi:10.1093/esr/jcq026.

Goldthorpe, J.H. 2003. The myth of education-based meritocracy. Why the theory isn't working. *New Economy* 10, 4: 234-39.

Gorard, S., and E. Smith. 2004. An international comparison of equity in education systems. *Comparative Education* 40, 1: 15-28.

Gray, J., D. Jesson, and B. Jones. 1984. Predicting differences in examination results between local education authorities: does school organisation matter? *Oxford Review of Education* 10, 1: 45-68.

Halsey, A.H., A.F. Heath, and J.M. Ridge. 1980. *Origins and Destinations. Family, Class, and Education in Modern Britain*. Oxford: Clarendon Press.

Heath, A.F., and S. Jacobs. 1999. Comprehensive reform in Britain. In *The comprehensive school experiment revisited: evidence from Western Europe*, 101-30. Frankfurt/Main: Peter Lang.

Heath, A.F., and McDonald, S.-K. 1987. Social change and the future of the left. *Political Quarterly* 53: 364-377.

Lacey, C. 1970. *Hightown Grammar. The school as a social system*. Manchester: Manchester University Press.

Lieberson, S. 1985. *Making It Count. The Improvement of Social Research and Theory*. Berkeley: University of California Press.

Mackie, J.L. 1974. *The cement of the universe*. Oxford: Oxford University Press.

Mahoney, J., and G. Goertz. 2006. A tale of two cultures: contrasting quantitative and qualitative research. *Political Analysis* 14, 3: 227-49.

Manning, A., and J.-S. Pischke. 2006. Comprehensive versus selective schooling in England & Wales: What do we know? London: London School of Economics. http://eprints.lse.ac.uk/19417/1/Comprehensive_Versus_Selective_Schooling_in_England_and_Wales_What_Do_We_Know.pdf.

Ministry of Education. 1954. Early Leaving. A Report of the Central Advisory Council for Education (England). London: HMSO.

Müller, W. 1998. Erwartete und unerwartete Folgen der Bildungsexpansion. In *Die Diagnosefähigkeit der Soziologie*, 81-112. Opladen: Westdeutscher Verlag.

Quine, W.V.O. 1952. The problem of simplifying truth functions. *American Mathematical Monthly* 59, 8: 521-31.

Ragin, C.C. 1987. *The Comparative Method. Moving beyond Qualitative and Quantitative Strategies*. Berkeley: University of California Press.

Ragin, C.C. 2000. *Fuzzy-Set Social Science*. Chicago: University of Chicago Press.

Ragin, C.C. 2005. From Fuzzy Sets to Crisp Truth Tables, 25. http://www.compasss.org/files/WPfiles/Raginfztt_April05.pdf.

Ragin, C.C. 2006. The Limitations of Net-Effects Thinking. In *Innovative Comparative Methods for Policy analysis*, 13-41. New York: Springer.

Ragin, C.C. 2008. *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. Chicago: University of Chicago Press.

Ragin, C.C., K.A. Drass, and S. Davey. 2006. *Fuzzy-Set/Qualitative Comparative Analysis 2.0*. Tucson, Arizona: Department of Sociology, University of Arizona. http://www.u.arizona.edu/%7Ecragin/fsQCA/software.shtml.

Shavit, Y., and H.-P. Blossfeld eds. 1993. *Persistent inequalities. Changing educational attainment in thirteen countries.* Boulder: Westview Press.

Turner, R.H. 1960. Sponsored and Contest Mobility and the School System. *American Sociological Review* 25, 6: 855-67.

Vester, M. 2006. Die ständische Kanalisierung der Bildungschancen. Bildung und soziale Ungleichheit zwischen Boudon und Bourdieu. In *Soziale Ungleichheit im Bildungssystem. Eine empirisch-theoretische Bestandsaufnahme*, 13-54. Konstanz: uvk.

Table 1: Perfect implication: sufficiency

'if A, then O' expressed in terms of inclusion, sufficient relationship		
	O	Not O
A	Present	Excluded
Not A	Possible	Possible

Table 2: Example quasi-sufficiency

Weaker implication, quasi-sufficient relationship: ‘if A, then (nearly always) O’		
	O	Not O
A	602	77
Not A	1158	529

Table 3: Example with two conditions

		O	Not O
A	B	151 (98.7%)	2 (1.3%)
	not B	451 (85.7%)	75 (14.3%)
not A	B	140 (98.6%)	2 (1.4%)
	not B	1018 (65.9%)	527 (34.1%)

Table 4: Truth table example

A	B	number of cases	O	consistency
1	1	153	1	0.987
0	1	142	1	0.986
1	0	526	1	0.857
0	0	1545	0	0.659

Table 5: QCA output example

	raw coverage	unique coverage	consistency
	---	---	---
A+	0.342	0.256	0.887
B	0.165	0.080	0.986
solution coverage: 0.422			
solution consistency: 0.904			

Table 6: Truth table, outcome “at least A level”

row number	male	service class	working class	high ability	in selective LEA	number of cases	at least A level	consistency
1	1	1	0	1	1	76	1	0.908
2	1	1	0	1	0	41	1	0.854
3	0	1	0	1	0	40	1	0.825
4	1	0	0	1	1	40	1	0.825
5	1	0	1	1	1	43	1	0.791
6	0	1	0	1	1	100	1	0.79
7	1	0	0	1	0	21	0	0.667
8	1	0	1	1	0	35	0	0.657
9	0	0	0	1	1	33	0	0.636
10	1	1	0	0	0	95	0	0.548
11	1	1	0	0	1	117	0	0.521
12	0	0	1	1	1	61	0	0.475
13	0	1	0	0	0	82	0	0.451
14	1	0	0	0	1	98	0	0.449
15	0	0	0	1	0	29	0	0.414
16	0	0	0	0	0	69	0	0.377
17	0	1	0	0	1	128	0	0.375
18	1	0	0	0	0	93	0	0.366
19	0	0	1	1	0	42	0	0.357
20	1	0	1	0	1	265	0	0.328
21	1	0	1	0	0	259	0	0.29
22	0	0	0	0	1	103	0	0.214
23	0	0	1	0	1	244	0	0.148
24	0	0	1	0	0	252	0	0.127

Table 7: QCA output “A level” outcome

	raw coverage	unique coverage	consistency
	---	---	---
CLASS_S*HIGH_ABILITY+	0.227	0.227	0.840
MALE*class_s*HIGH_ABILITY*LEATYPE_SELECTIVE	0.070	0.070	0.807
solution coverage: 0.297			
solution consistency: 0.832			

Table 8: High ability cases in selective LEAs

truth table row		social class	number	consistency/proportion obtaining at least A level
1	male	service	76	0.908
5	male	working	43	0.791
6	female	service	100	0.79
12	female	working	61	0.475

Table 9: High ability cases in comprehensive LEAs

truth table row		social class	number	consistency/proportion obtaining at least A level
2	male	service	41	0.854
3	female	service	40	0.825
8	male	working	35	0.657
19	female	working	42	0.357

Table 10: Truth table, outcome “at least O level”

row number	male	service class	working class	low ability	in selective LEA	number of cases	at least O level	consistency
1	1	1	0	0	1	166	1	0.964
2	1	1	0	0	0	106	1	0.934
3	0	1	0	0	1	207	1	0.928
4	1	0	0	0	1	107	1	0.925
5	0	0	0	0	0	80	1	0.913
6	0	1	0	0	0	109	1	0.899
7	1	0	0	0	0	72	1	0.875
8	1	0	1	0	0	171	1	0.842
9	0	0	0	0	1	107	1	0.832
10	1	0	1	0	1	174	1	0.822
11	0	0	1	0	1	204	0	0.735
12	0	0	1	0	0	176	0	0.727
13	0	1	0	1	0	13	0	0.615
14	1	0	1	1	1	134	0	0.604
15	1	1	0	1	1	27	0	0.593
16	0	1	0	1	1	21	0	0.571
17	1	1	0	1	0	30	0	0.567
18	1	0	0	1	1	31	0	0.548
19	1	0	1	1	0	123	0	0.528
20	0	0	0	1	0	18	0	0.5
21	1	0	0	1	0	42	0	0.429
22	0	0	1	1	0	118	0	0.339
23	0	0	1	1	1	101	0	0.317
24	0	0	0	1	1	29	0	0.241

Table 11: QCA output “at least O level” outcome

0.8 cut-off:

	raw coverage	unique coverage	consistency
class_w*low_ability+	0.496	0.404	0.915
MALE*class_s*low_ability	0.255	0.163	0.857

solution coverage: 0.659
solution consistency: 0.893

Figure 1: Sufficiency

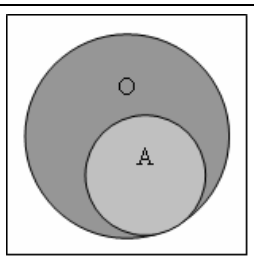
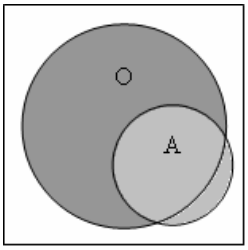
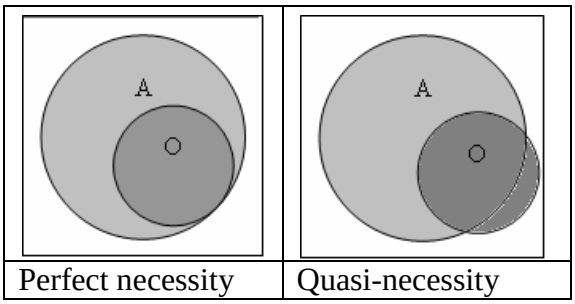
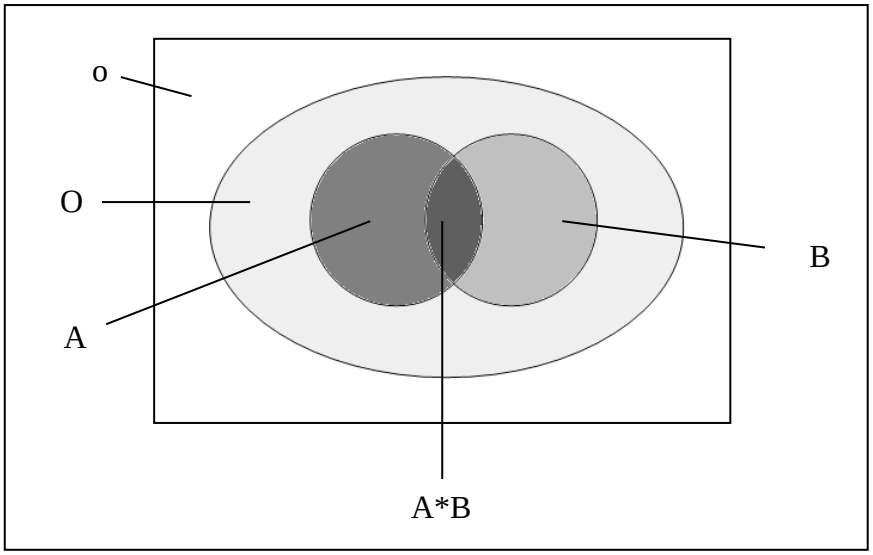
	
Perfect sufficiency	Quasi-sufficiency

Figure 2: Necessity



Perfect necessity	Quasi-necessity

Figure 3: Venn diagram of overlapping conditions



Contact details:

Judith Glaesser (corresponding author) and Barry Cooper
School of Education
Durham University
Leazes Road
Durham
DH1 1TA
Tel. (JG): 0191-334 8308
Judith.Glaesser@durham.ac.uk
Barry.Cooper@durham.ac.uk

Biographies

Dr. Judith Glaesser is an ESRC Research Fellow in the School of Education at Durham University. Her interests include sociology of education, inequality and meritocracy in education, and research methods, particularly fs/QCA. She studied for a PhD at Konstanz University (published as *Soziale und individuelle Einflüsse auf den Erwerb von Bildungsabschlüssen).* Currently, with Barry Cooper, she is exploring the application of case-based methods to large datasets in comparing transitions in the English and German secondary school systems.

Barry Cooper is a Professor of Education in the School of Education at Durham University where he was, from 1998 to 2005, Director of Research. He was from 2004-2007 co-editor of the *British Educational Research Journal*. His interests are in the sociology of education, especially social class and educational achievement and the sociology of assessment, research methods (most recently, working with Judith Glaesser, exploring the application of fs/QCA to large datasets and the relations between fs/QCA and cluster analysis) and the evaluation of educational aid projects. His most recent book was, with Máiréad Dunne, *Assessing Children's Mathematical Knowledge: Social class, sex and problem-solving*.